

REMARKS

Entry of the foregoing, reexamination and reconsideration of the above-identified application is respectfully requested.

The claims have been amended to recite "isolated" in the relevant claims. Claims 2 and 3 as well as claims dependent therefrom have been amended to recite "nucleic acid" rather than gene. This amendment broadens the scope of the claims since the claim would now include a "gene" but is not so limited. "Plant" has been amended to "transgenic plant" where appropriate as well. Claims have also been amended to make more clear that the "progeny" is progeny of the plant. No new matter has been added by these amendments. Nor have the claims been narrowed since they now simply recite what was implicit.

Claims 1, 3-8, 11-14, 16-18, 20-22, 32-34, 36-38, 40-42 and 44-46 have been rejected under 35 U.S.C. §112, first paragraph, as allegedly containing subject matter not described in the specification. This rejection, as it applies to the claims as now amended, is respectfully traversed.

According to the Examiner, the specification does not describe the structure of any nucleotide sequence encoding a protein that has an activity of regulating the pH of vacuoles in plant cells in which the amino acid sequence of SEQ ID NO:2 has been deleted, added to or substituted. Nor does the specification allegedly describe the structure of any nucleotide sequence encoding a protein that has an activity of regulating the pH of vacuoles in plants cells which hybridizes to a nucleic acid encoding SEQ ID NO:2. The

specification also allegedly fails to describe the structure of any sequences encoding a protein that has an activity of regulating the pH of vacuoles in plant cells which has 20% or more or 70% or more sequence identity to SEQ ID NO:2.

It is respectfully submitted that the specification provides the novel sequence of SEQ ID NO:2. Having this information, one skilled in the art would recognize the “structure” of such modified sequences since one skilled in the art would know how to modify the sequence and would know alternative amino acids that could be substituted, for example. With knowledge in the art at the time of the invention, one skilled in the art would recognize which amino acids are similar in structure and which substitutions would not change the properties and structure of the encoded protein.

The specification further describes a nucleotide sequence encoding a protein that has an activity of regulating the pH of vacuoles in plant cells in which the amino acid sequence of SEQ ID NO:2 has been deleted:

Alternatively, in order to obtain DNA encoding a protein comprising a shortened amino acid sequence, an amino acid sequence longer than the amino acid sequence of interest, for example, DNA encoding the full-length amino acid sequence, may be cleaved with a desired restriction enzyme, and when the resultant DNA fragment was found not to encode the entire amino acid sequence of interest, a DNA fragment comprising the sequence of the lacking portion may be synthesized and ligated thereto.

Based upon this description, one skilled in the art would recognize that applicants had indeed invented a nucleotide sequence of SEQ ID NO: 2 which includes deletions and which results in a functional protein.

Once the claimed modifications to the nucleotide sequence of SEQ ID NO: 2 were made, it is well within the skill of the art to test the activity of the protein encoded by the modified sequence. *See, e.g.*, page 8, line 31 - page 9, line 1. One skilled in the art can readily determine the flower color and determine whether the gene is being expressed or suppressed. *See, e.g.*, page 19, lines 11-24.

Based upon this information and the knowledge in the art, one skilled in the art would recognize the invention as claimed as being fully described by the specification.

Withdrawal of the rejection of record is respectfully requested and believed to be in order.

Claims 1, 3-8, 11-14, 16-18, 20-22, 32-34, 36-38, 40-42 and 44-46 have been rejected under 35 U.S.C. §112, first paragraph, as allegedly containing subject matter not enabled by the specification. This rejection, as it now applies to the pending claims, is respectfully traversed.

The nucleic acid encoding an amino acid sequence of SEQ ID NO:2 is admitted to be enabled. One skilled in the art would be fully enabled to make and use the invention as claimed. No undue experimentation would be required. Once in possession of the sequence of SEQ ID NO:2, one skilled in the art could readily modify the sequence by addition, substitution and deletion. These techniques of altering nucleotide sequence were well known at the time of the invention. Once the modified sequence was obtained, one skilled in the art could express the sequence and determine whether the activity of pH of vacuoles was being regulated and flower color altered, as described in the specification.

The specification further describes a nucleotide sequence encoding a protein that has an activity of regulating the pH of vacuoles in plant cells in which the amino acid sequence of SEQ ID NO:2 has been deleted:

Alternatively, in order to obtain DNA encoding a protein comprising a shortened amino acid sequence, an amino acid sequence longer than the amino acid sequence of interest, for example, DNA encoding the full-length amino acid sequence, may be cleaved with a desired restriction enzyme, and when the resultant DNA fragment was found not to encode the entire amino acid sequence of interest, a DNA fragment comprising the sequence of the lacking portion may be synthesized and ligated thereto.

Based upon this description, one skilled in the art would be enabled to make a gene as claimed.

Moreover, it is well within the skill of the art to determine whether a particular sequence will hybridize to the nucleotide sequence of SEQ ID NO: 2 under stringent conditions. One skilled in the art recognizes such conditions and could readily test different sequences.

Once the claimed modifications to the nucleotide sequence of SEQ ID NO: 2 were made or hybridizing sequences were found, it is well within the skill of the art to test the activity of the protein encoded by the modified sequence. *See, e.g.*, page 8, line 31 - page 9, line 1. One skilled in the art can readily determine the flower color and determine whether the gene is being expressed or suppressed. *See, e.g.*, page 19, lines 11-24.

Based upon this information and the knowledge in the art, one skilled in the art would be enabled to practice the invention as claimed based upon the description in the specification and knowledge in the art.

Withdrawal of the rejection of record is respectfully requested and believed to be in order.

Claims 6, 11, 12, 18, 22, 30-38, 42 and 46 have been rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite. This rejection, as it applies to the claims now of record, is respectfully traversed.

According to the Examiner, the phrase “stringent condition” would be unclear. This assertion is respectfully traversed. A claim employing this language was granted in U.S. Patent No. 5,910,627 (cited in the prior art rejection), which claimed a “polynucleotide sequence that hybridizes under stringent conditions to a Ph6 nucleic acid having the sequence of SEQ ID NO:1.” *See*, claim 1. Such claim language would thus be sufficiently clear, as shown by the issued patent claim. Moreover, by reference to the specification, one skilled in the art would note the example of 5 x SSC and 50°C. Since the term would be clear to a person skilled in the art based upon knowledge in the art and by reference to the specification, the claims need not be amending recite specific hybridization conditions.

The phrase “same property” in claims 11, 12 and 31-38 is also said to be unclear. The claims have been amended to more clearly define the property of the plant, i.e., that the ph of vacuoles is regulated in plant cells and flower color is altered. The phrase “progeny thereof” in claims 12 and 35-38 is also allegedly unclear. These claims have been amended to make clear that the progeny is of the plant, not a cut flower.

In view of the instant amendments, the claims are now sufficiently clear.

Withdrawal of the rejection of record is respectfully requested and believed to be in order.

Claims 1-6 have been rejected under 35 U.S.C. §101 as allegedly being directed to non-statutory subject matter. The claims have been amended, as suggested by the Examiner, to recite "an isolated nucleic acid sequence."

Withdrawal of the rejection of record is respectfully requested and believed to be in order.

Claims 11, 12 and 31-38 have also been rejected under §101. According to the Examiner, it is unclear whether the claimed progeny or tissue would be distinguishable from those occurring in nature. The claims have been amended as suggested to make clear that the progeny or tissue comprise the isolated nucleic acid that was introduced into the parent plant.

Withdrawal of the rejection of record is respectfully requested. Such action is believed to be in order.

Claims 1, 3, 6-8, 11-14, 16, 18, 20, 22, 32, 34, 36, 38, 40, 42, 44 and 46 have been rejected under 35 U.S.C. §102(b) as allegedly being anticipated by Chuck et al (U.S. Patent No. 5,910,627), which issued on June 8, 1999.¹ Claims 1, 3-8, 16-18 and 20-22 have been rejected under 35 U.S.C. §102(b) as allegedly being anticipated by Gaxiola et al (*PNAS* February 1999). These rejections are respectfully traversed.

¹Applicants note that the Chuck et al reference can be removed as §102(b) prior art by submission of a translation of the priority document, as filed on August 24, 1999.

In accordance with the Official Action, the basis of these prior art rejections is that, due to the breadth of the claims, the references describe a sequence falling within the scope of the claimed sequences which would encode a protein having the required activity. Each of the claims, however, requires that the encoded protein regulate the pH of vacuoles in plant cells and alter flower color. Neither reference, however, discloses or even suggests a nucleotide sequence or gene as instantly claimed. Chuck et al describes the Ph6 gene, which encodes a transcriptional regulator protein. Chuck et al, however, does not describe a Na⁺-H⁺ antiporter gene as instantly claimed. With respect to Gaxiola et al, this reference does not disclose or suggest a gene or nucleic acid sequence encoding a protein which will alter flower color, as instantly claimed.

The cited art thus fails to anticipate the instantly claimed invention. Withdrawal of the rejections of record is thus respectfully requested and believed to be in order.

In view of the above, all of the pending claims are believed to be in condition for allowance. At the very least, claims 2, 15, 19, 31, 35, 39 and 43 are now in condition for allowance.

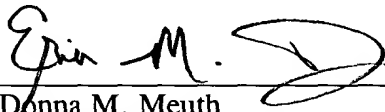
Further and favorable action in the form of a Notice of Allowance is respectfully requested and believed to be in order.

In the event that there are any questions relating to this Preliminary Amendment, or to the application in general, it would be appreciated if the Examiner would telephone the undersigned attorney at (650) 622-2360 concerning such questions so that prosecution of this application may be expedited.

Respectfully submitted,

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